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TII 20
SEPM Assignment 2

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Q.1 Differentiate between CPM and PERT

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PERT	CPM
1) PERT is that technique of project management which is used to manage uncertain activities of any project.	CPM is that technique of project management which is used to manage only certain activities of any project
2) It is event oriented technique which means that network is constructed on the basis of event.	It is activity oriented technique which means that network is constructed on the basis of activities
3) It is a probability model	It is a deterministic model.
4) It majorly focuses on time as meeting time target or estimation of percent completion is more important.	It majorly focuses on time-cost trade off as minimizing cost is more important.
5) It is appropriate for high precision time estimation	It is appropriate for reasonal time estimation.
6) It has non-repetitive nature of job	It has repetitive nature of job.
7) There is no chance of crashing as there is no certainity of time	There may be crashing beca of certain time boundation.

8)	It doesn't use any dummy activities	It uses dummy activities for representing sequence of activities
9)	It is suitable for projects which required research and development	It is suitable for construction projects.

Q.2 Explain the difference between

1) Total Slack and free slack

spect	Total Slack (Total float)	free Slack (free float)
efinition	Amount of time a task can be delayed without delaying the project's overall completion date	Amount of time a task can be delayed without delaying the early start of any successor task
lculation	Difference between the latest start time and earliest start time, or latest finish time and earliest finish time of a task	Difference between the earliest start time of the next task and the earliest finish time of the current task.
pact	Indicates the flexibility or buffer available for a task within the project schedule.	Indicates the flexibility or buffer available for a task without affecting the start time of subsequent tasks
ues	Concerned with project's overall timeline & completion date	Concerned with the relationship between individual tasks within the project

ii) AON and AOA Diagrams

Aspect	AON Diagrams	AOA Diagrams
Representation	Activities represented by nodes connected by arrows depicting the sequence of activi	Activities represented by arrows connecting nodes representing events or points i to
Activity Representation	Nodes represent activities, arrows show dependencies	Nodes represent events or milestones, lines represent activities between events.
Flexibility	Offers more flexibility in representing complex relationships between activities, as nodes can be rearranged and connected with multiple arrows.	Maybe less flexible in representing complex project structures, as activities are directly connected between events.
Critical Path Identification	Identified by tracing the longest path from the start node to the end node through the network	Identified by tracing the long path from the initial eve to the final event throug the network.

Q.3 Explain Risk identification, Risk projection, RMMM plan in detail

→ 1. Risk Identification

Risk identification is the process of recognizing and documenting potential risks that could affect a project, its objectives, or outcomes. It's a crucial step in risk management that involves systematically identifying, describing and understanding the risks that could impact the project.

Possible Risks:

- Product size - risks associated with overall size of the software to be built
- Business impact - risks associated with constraints imposed by management or the marketplace.
- Customer characteristics - risks associated with sophistication of the customer and the developer's ability to communicate with the customer in a timely manner
- Process definition - risks associated with the degree to which the software process has been defined and is followed.
- Development Environment - risks associated with availability and quality of the tools to be used to build the project.
- Technology to be built - risks associated with complexity of the system to be built and the "newness" of the technology in the system.
- Staff size and experience - risks associated with overall technical and project experience of the software engineers who will do the work.

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2. Risk Projection

Risk projection, also known as risk assessment or risk analysis, involves analyzing identified risks to estimate their potential impact on the project objectives and outcomes. This step helps in prioritizing risks based on their severity and likelihood, allowing project teams to focus their efforts on managing high-priority risks effectively. Here's how risk projection is typically carried out:

- Risk Analysis: Each identified risk is analyzed to determine its potential impact on project objectives in terms of scope, schedule, cost, quality, and other relevant factors.

- Quantitative Analysis: Quantitative analysis involves accessing risks based on subjective criteria such as expert judgement, experience, and historical data to determine their relative importance and prioritize them accordingly.

- Risk prioritization: Risks are prioritized based on their severity, likelihood, and potential impact on project success. High-priority risks are given more attention and resources for mitigation and contingency planning.

3. RMMM Plan (Risk Mitigation, Monitoring and Managemen Plan):

The RMMM plan outlines how identified risks will be managed throughout the project lifecycle. It includes strategies for mitigating, monitoring and responding to risks to minimize their impact on project objectives. Here's what a typical RMMM plan entails:

Risk Mitigation:

It is an activity used to avoid problems (Risk Avoidan Steps for mitigating the risks as follows.

1. finding out the risk.
2. Removing causes that are the reason for risk creation
3. Controlling the corresponding documents from time to t
4. Conducting timely reviews to speed up the work.

Risk Monitoring:

It is an activity used for project tracking.

It has the following primary objectives as follows.

1. To check if predicted risks occur or not.
2. To ensure proper application of risk aversion steps defined for risk
3. To collect data for future risk analysis
4. To allocate what problems are caused by which risks throughout the project.

Risk Management and planning:

It assumes that the mitigation activity failed and the risk is a reality. This task is done by Project manager when risk becomes reality and causes severe problems. If the project manager effectively uses project mitigation to remove risks successfully then it is easier to manage the risks. This shows that the response that will be taken for each risk by a manager. The main objective of the risk management plan is the risk register. The risk register describes and focuses on the predicted threats to a software project.

Q.4 Consider a XYZ company under take a project to computerized working of ABC City Bank, then-

i) Develop W.B.S. for the same project.
ii) Develop responsibility matrix.

→ Work Breakdown Structure (WBS)
A WBS is a hierarchial decomposition of the project into manageable sections. Below is a four-level WBS for computerizing ABC City Bank:

Level 1: Project Name
- Computerization of ABC

Level 2 : Major Phases

1. Project Initiation
2. Requirement Analysis
3. System Design and Development
4. Testing and Quality Assurance
5. Deployment & Training
6. Maintenance & Support

Level 3 : Subtasks Under Each Phase

Phase	Subtasks
1. Project Initiation	Project charter, feasibility study, stakeholde identification, project planning
2. Requirement Analysis	Data collection, user needs assessment, funct & non-functional requirements documentati
3. System Design & Development	System architecture design, database design, frontend and backend development, API integration.
4. Testing & Quality Assurance	Unit testing, integration testing, security testing, performance testing.
5. Deployment & Training	System deployment, user training, documentation preparation.
6. Maintenance & Support	Bug fixes, system upgrades, security patches, user support.

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ii) Responsibility Assignment Matrix (RAM)

A RAM or RACI Matrix assigns roles and responsibilities to team members.

Task	Project Manager	Business Analyst	Developers	QA Team	IT Support	End Users
Project Initiation	R, A	C	–	–	–	–
Requirement Analysis	A	R	C	–	–	I
System Design	A	C	R	–	–	–
Development	A	C	R	–	–	–
Testing	A	C	C	R	–	–
Deployment	A	C	R	C	R	I
User training	C	R	C	–	–	R
Maintenance & Support	A	–	C	C	R	I

- R (Responsible) : Person who does the work.
- A (Accountable) : Person who ensures the work is completed
- C (Consulted) : Person who provides input or expertis
- I (Informed) : Person who is kept updated on progress.

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Q.5 Explain software Configuration Management in detail

→ Software Configuration Management (SCM) is a set of practices and processes used to systematically manage and control changes to software products throughout their lifecycle. It involves tracking and managing software configurations, ensuring that all changes are properly documented, controlled, and tested to maintain the integrity and quality of the software. Here's a detailed explanation of SCM:

1. Version Control :

- Version control is a fundamental aspect of SCM, involving the management of different versions of software artifacts such as source code, documents and binaries

- Version control systems (VCS) are used to track changes made to files, allowing developers to collaborate on projects, manage concurrent development, and revert to previous versions if needed.

- VCS tools like Git, Subversion (SVN), and Mercurial provide features ~~like~~ for branching, merging, tagging and conflict resolution to facilitate effective version control.

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2. Configuration Identification :

- Configuration identification involves uniquely identifying and labeling software components, versions and releases throughout their lifecycle.
- Each software configuration item (SCI) is assigned a unique identifier and documented in a configuration management system (CMS) or repository.

3. Change Management:

- Change management encompasses the process of requesting, evaluating, approving, implementing, and verifying changes to software configurations.
- Change requests (CRs) are submitted to propose modifications, additions or deletions to software components.
- Changes are implemented, tested and validated before being integrated into the mainline codebase or released as a part of a new software version.

4. Configuration Control:

- Configuration control involves enforcing policies and procedures to manage changes systematically and prevent unauthorized modifications to software configurations.

- Access controls, permissions, and workflow automation are implemented to regulate & who can make changes to software artifacts and under what conditions

- Versioning and audit trails are maintained to track the history of changes and facilitates accountability and traceability.

5. Configuration Status Accounting :

- Configuration Status Accounting (CSA) involves capturing and reporting information about the current state and history of software configurations.

- CSA provides visibility into the status of configuration items, including their versions, changes, dependencies and relationships

6. Release Management :

- Release management focuses on planning, coordinating, and delivering software releases to users or customers.

- It involves defining release packages, managing release schedules, conducting release testing and coordinating deployment activities.

Q.6 Explain the significance of Gantt-charts in project management.

→ Gantt charts are visual representations of tasks plotted against time. They represent crucial information in a project, such as who is assigned to what, task durations, and overlapping activities. A Gantt chart depicts the completion of each work in a project using timelines. These timelines explain how the various tasks are connected. Gantt charts are useful because they show the activities and progress of a project.

Benefits of Gantt Charts:

1. Allows Better Tracking

Project leaders and members can use a Gantt chart to keep track of tasks, milestones and overall workflow. The chart can show potential constraints or concerns, allowing project leaders and members to make appropriate adjustments.

2. Provides High-Level Overview

For both individuals who are directly committed and those with less involvement, such as executives and other stakeholders, a Gantt chart provides an overall perspective of a project and its timeframe.

3. Boosts Productivity

A Gantt chart enables workers to collaborate in order to increase production. A Gantt chart's great visibility helps workers keep focused on the tasks they need to finish. This transparency also ensures that all team members are held accountable for their tasks. Keep track of your project plans and teams progress and generate detailed reports with project planning software.

4. Illustrates overlaps and Dependencies

A Gantt chart illustrates how tasks in a project may intersect. It also demonstrates how the start of one job might be contingent on the completion of another. This type of data enables project managers to schedule work and allocate resources in a way that does not stymie project progress.

5. Manage Complex Information

A Gantt chart's visual charity can aid in the simplificat of a complex set of tasks. The charts depicts tasks in a straight forward and simple manner for those who must complete them. Team members can stay focused and avoid becoming overwhelmed by a huge number of duties because of this transpare

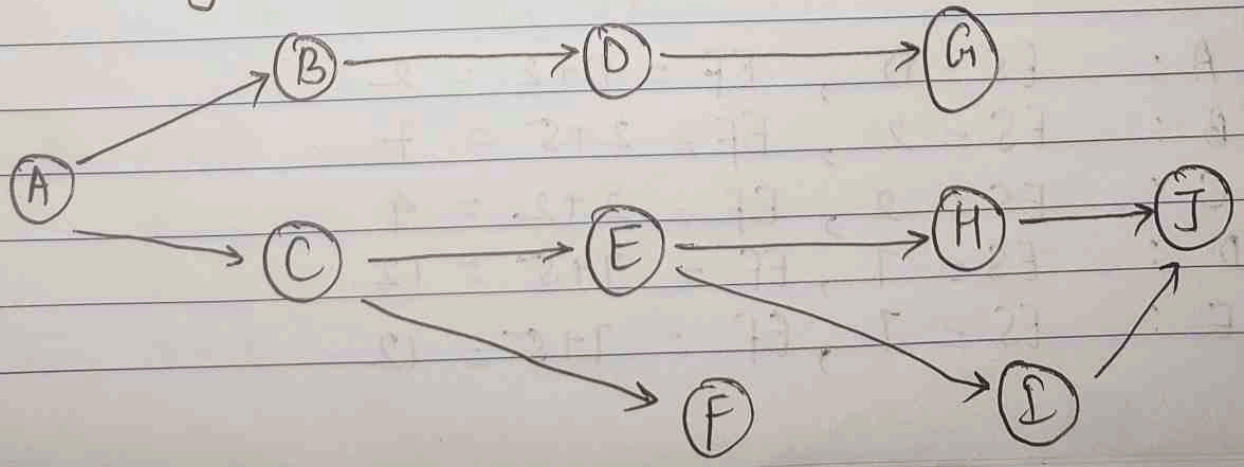
6. Balance Multiple Projects

Managers can quickly track many projects using a Gantt charts. Because the chart shows how to give the proper resources at the right time, it allows those managers to balance the work on each project.

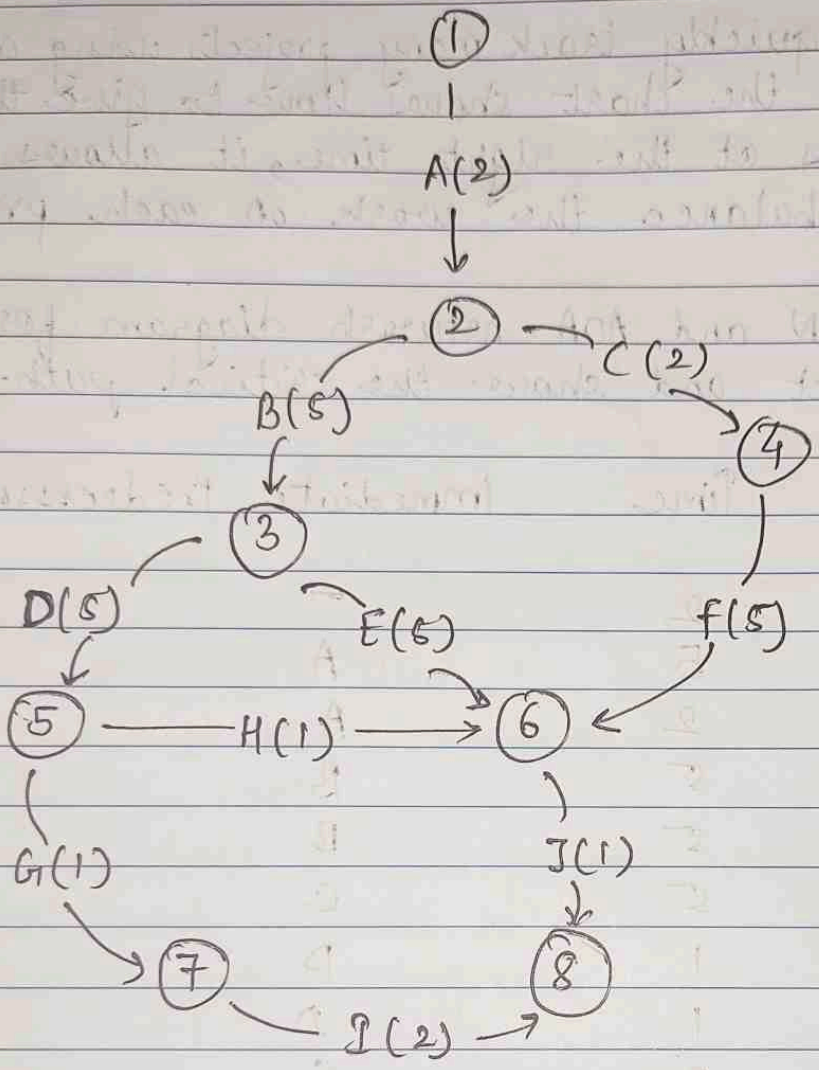
Q.7 Draw the AON and AOA network diagram for the following project and show the critical path.

Activity	Time	Immediate Predecessor
A	2	-
B	5	A
C	2	A
D	5	B
E	5	B
F	5	C
G	1	D
H	1	D
I	2	G
J	1	E, F, H, I

→ AON (Activity on Node) Diagram



AOA (Activity on arrow) Diagram :



critical path calculation :

forward pass (ES & EF) :

A : ES = 0 , Ef = 0+2 = 2
B : ES = 2 , Ef = 2+5 = 7
C : ES = 2 , Ef = 2+2 = 4
D : ES = 7 , Ef = 7+5 = 12
E : ES = 7 , Ef = 7+5 = 12

F: ES = 4, EF = 4+5 = 9
G: ES = 12, EF = 12+1 = 13
H: ES = 12, EF = 12+1 = 13
I: ES = 13, EF = 13+2 = 15
J: ES = max(12 from E, 9 from F, 13 from H, 15 from I)
= 15+1 = 16

Project Duration = 16 units

Backward Pass (LS & LF):

J: LF = 16, LS = 16-1 = 15
I: LF = 15, LS = 15-2 = 13
H: LF = 15, LS = 13-1 = 12
G: LF = 13, LS = 13-1 = 12
F: LF = 15, LS = 9-5 = 4
E: LF = 15, LS = 12-5 = 7
D: LF = 12, LS = 12-5 = 7
C: LF = 4, LS = 4-2 = 2
B: LF = 7, LS = 7-5 = 2
A: LF = 2, LS = 2-2 = 0

Slack Calculation

slack = LS - ES (or LF - EF)

A: 0-0 = 0
B: 2-2 = 0
C: 2-2 = 0
D: 7-7 = 0

E : 7 - 7 = 0
F : 4 - 4 = 0
G : 12 - 12 = 0
H : 12 - 12 = 0
I : 13 - 13 = 0
J : 15 - 15 = 0

Critical Path : A → B → D → G → I → J

Duration : 2 + 5 + 5 + 1 + 2 + 1 = 16

All activities have zero slacks, but this path is the longest and determines the project duration.